

12BY7-A

PENTODE

FOR TV VIDEO AMPLIFIER APPLICATIONS

DESCRIPTION AND RATING

The 12BY7-A is a miniature power pentode designed primarily for use as the video output amplifier in television receivers. Features of the tube include extremely high transconductance, low interelectrode capacitances, and high power sensitivity.

Electrically and mechanically, the 12BY7-A is a replacement for the 12BY7. In addition, however, the 12BY7-A exhibits a controlled heater warm-up characteristic which makes the tube particularly suited for use in television receivers which employ series-connected heaters. When the 12BY7-A is used in conjunction with other 600-milliampere types which exhibit essentially the same heater warm-up characteristic, heater voltage surges across the individual tubes are minimized during the warm-up period.

GENERAL

ELECTRICAL

	Series	Parallel
Cathode—Coated Unipotential		
Heater Voltage, AC or DC	12.6	6.3 Volts
Heater Current	0.3	0.6 Amperes
Heater Warm-up Time*	..	11 Seconds
Direct Interelectrode Capacitances†		
Grid-Number 1 to Plate, maximum	0.063 μμf	
Input	10.2 μμf	
Output	3.5 μμf	

MECHANICAL

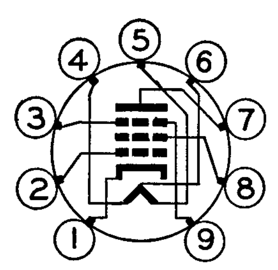
Mounting Position—Any
Envelope—T-6½, Glass
Base—E9-1, Small Button 9-Pin

MAXIMUM RATINGS

DESIGN-CENTER VALUES

Plate Voltage	300 Volts
Screen Voltage	180 Volts
Positive DC Grid-Number 1 Voltage	0 Volts
Negative DC Grid-Number 1 Voltage	50 Volts
Plate Dissipation	6.5 Watts
Screen Dissipation	1.1 Watts
Heater-Cathode Voltage	
Heater Positive with Respect to Cathode	200 Volts
Heater Negative with Respect to Cathode	200 Volts
Grid-Number 1 Circuit Resistance	
With Fixed Bias	0.25 Megohms
With Cathode Bias	1.0 Megohms

BASING DIAGRAM

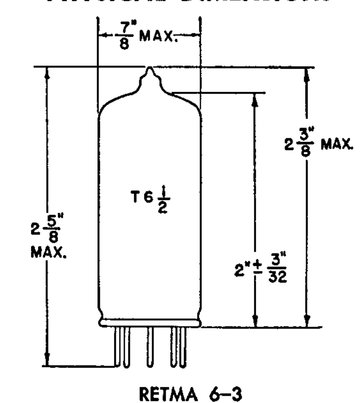


RETMA 9BF

TERMINAL CONNECTIONS

Pin 1—Cathode
Pin 2—Grid Number 1
Pin 3—Internal Shield and Grid Number 3 (Suppressor)
Pin 4—Heater
Pin 5—Heater
Pin 6—Heater Center-Tap
Pin 7—Plate
Pin 8—Grid Number 2 (Screen)
Pin 9—Internal Shield and Grid Number 3 (Suppressor)

PHYSICAL DIMENSIONS



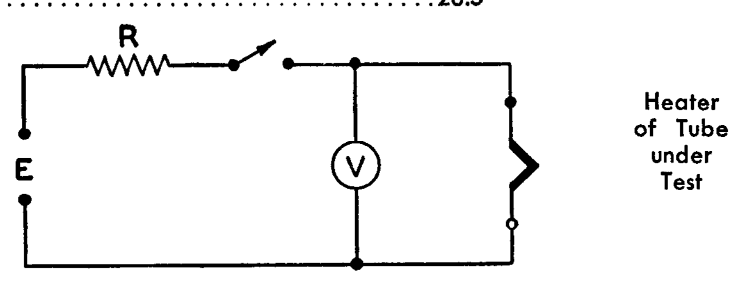
RETMA 6-3

CHARACTERISTICS AND TYPICAL OPERATION

CLASS A_1 AMPLIFIER

Plate Voltage	250	Volts
Suppressor, Connected to Cathode at Socket		
Screen Voltage	180	Volts
Cathode-Bias Resistor	100	Ohms
Plate Resistance, approximate	0.093	Megohms
Transconductance	11000	Micromhos
Plate Current	26	Milliamperes
Screen Current	5.75	Milliamperes
Grid-Number 1 Voltage, approximate IG=20 Microamperes	−11.6	Volts
Triode Amplification Factor	28.5	

* Heater warm-up time is defined as the time required in the circuit shown at the right for the voltage across the heater terminals (V) to increase from zero to the heater test Voltage (V_1). For this type, E=25 volts (RMS or DC), V_1=5.0 volts (RMS or DC), and R=31.5 ohms.



† Without external shield.

AVERAGE PLATE CHARACTERISTICS

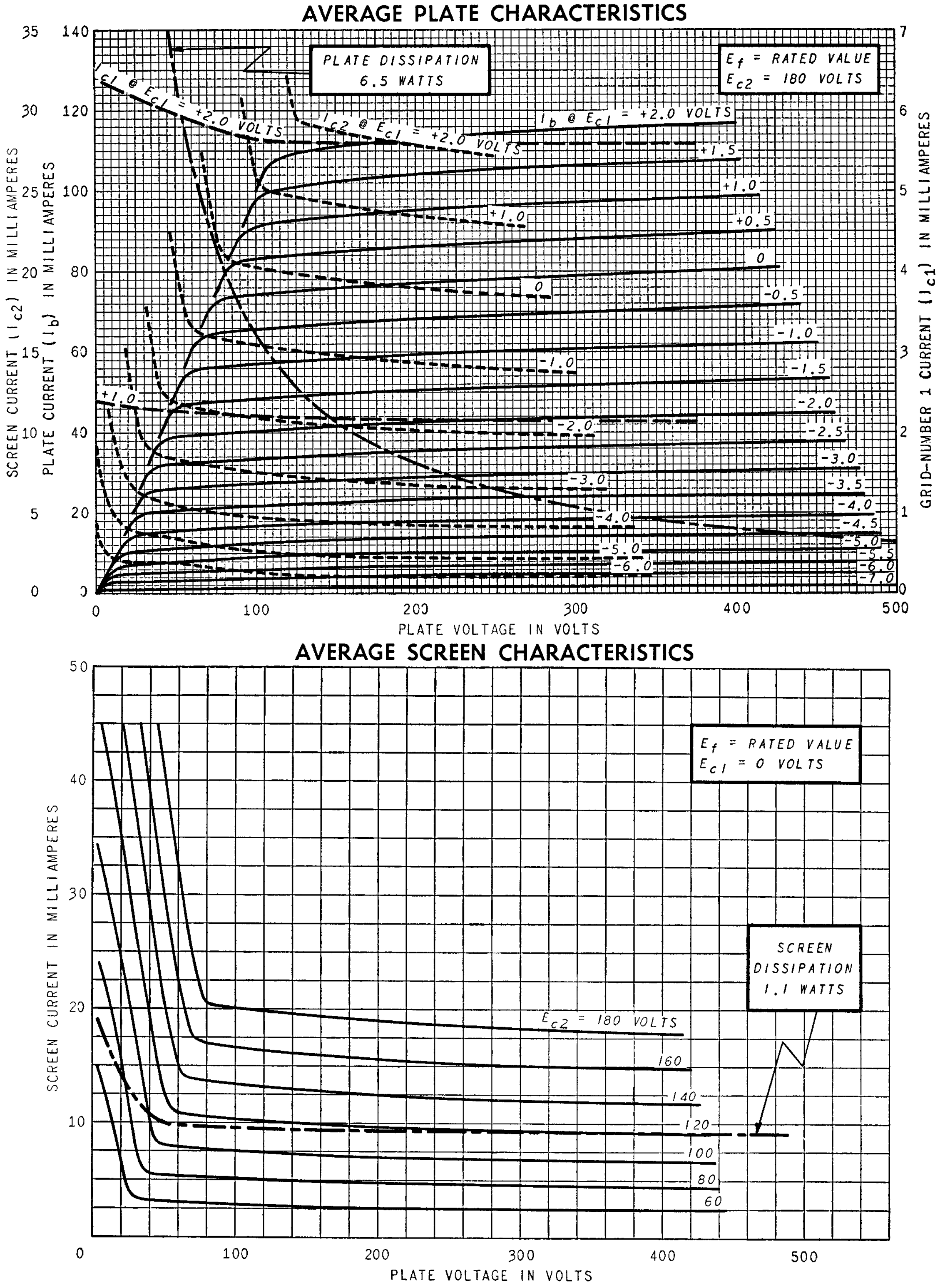
E_f = RATED VALUE
E_{c1} = 0 VOLTS

E_{c2} = 180 VOLTS
160
140
120
100
80
60

PLATE DISSIPATION 6.5 WATTS

PLATE CURRENT IN MILLIAMPERES (0, 20, 40, 60, 80, 100)

PLATE VOLTAGE IN VOLTS (0, 100, 200, 300, 400, 500)


AVERAGE PLATE CHARACTERISTICS
PLATE DISSIPATION 6.5 WATTS
Ef = RATED VALUE
Ec2 = 180 VOLTS
Ic1 @ Ec1 = +2.0 VOLTS
Ic2 @ Ec1 = +2.0 VOLTS
Ib @ Ec1 = +2.0 VOLTS
+1.5
+1.0
+0.5
0
-0.5
-1.0
-1.5
-2.0
-2.5
-3.0
-3.5
-4.0
-4.5
-5.0
-5.5
-6.0
-7.0
SCREEN CURRENT (Ic2) IN MILLIAMPERES
PLATE CURRENT (Ib) IN MILLIAMPERES
GRID-NUMBER 1 CURRENT (Ic1) IN MILLIAMPERES
PLATE VOLTAGE IN VOLTS
AVERAGE SCREEN CHARACTERISTICS
Ef = RATED VALUE
Ec1 = 0 VOLTS
SCREEN DISSIPATION 1.1 WATTS
Ec2 = 180 VOLTS
160
140
120
100
80
60
SCREEN CURRENT IN MILLIAMPERES
PLATE VOLTAGE IN VOLTS

AVERAGE TRANSFER CHARACTERISTICS

E_f = RATED VALUE
E_b = 250 VOLTS

E_{c2} = 180 VOLTS
160
140
120
100
80
60

PLATE CURRENT IN MILLIAMPERES

100
80
60
40
20

-7 -6 -5 -4 -3 -2 -1 0

GRID-NUMBER 1 VOLTAGE IN VOLTS

AVERAGE TRANSFER CHARACTERISTICS

E_f = RATED VALUE
E_b = 250 VOLTS

E_{c2} = 180 VOLTS
160
140
120
100
80
60

SCREEN CURRENT IN MILLIAMPERES

20
16
12
8
4

-7 -6 -5 -4 -3 -2 -1 0

GRID-NUMBER 1 VOLTAGE IN VOLTS

AVERAGE TRANSFER CHARACTERISTICS

